DPP - Daily Practice Problems

Chapter-wise Sheets

Date : ☐ Start Time : ☐ End Time : ☐

CHEMISTRY CC24

SYLLABUS : Haloalkanes and Haloarenes

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. *o*-Methoxybromobenzene is treated with sodamide and then with ammonia. The product formed is

(a) *o*-Methoxyaniline (b) Aniline

(c) Methoxybenzene (d) *m*-Methoxyaniline

2. Gem-dibromide is

(a) $CH_3CH(Br)CH_2(Br)$ (b) $CH_3CBr_2CH_3$

(c) $CH_2(Br)CH_2CH_2$ (d) CH_2BrCH_2Br

3. Arrange the following compounds in order of increasing dipole moment :

Toluene (I)
m-dichlorobenzene (II)
o-dichlorobenzene (III)
p-dichlorobenzene (IV)

(a) I < IV < II < III (b) IV < I < II < III

(c) IV < I < III < II (d) IV < II < I < III

4. The compound formed on heating chlorobenzene with chloral in the presence of concentrated sulphuric acid, is

(a) freon (b) DDT

(c) gammexene (d) hexachloroethane

5. Which among MeX, RCH_2X, R_2CHX and R_3CX is most reactive towards S_N2 reaction?

(a) MeX (b) RCH_2X

(c) R_2CHX (d) R_3CX

6. In the preparation of chlorobenzene from aniline, the most suitable reagent is

(a) Chlorine in the presence of ultraviolet light

(b) Chlorine in the presence of $AlCl_3$

(c) Nitrous acid followed by heating with Cu_2Cl_2

(d) HCl and Cu_2Cl_2

7. On sulphonation of C_6H_5Cl

(a) *m*-Chlorobenzenesulphonic acid is formed

(b) Benzenesulphonic acid is formed

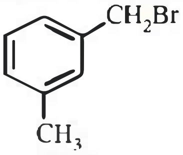
(c) *o*-Chlorobenzenesulphonic acid is formed

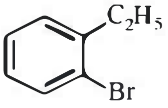
(d) *o*- and *p*-Chlorobenzenesulphonic acid is formed

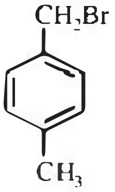
RESPONSE GRID	
	1. ⓐⓑⓒⓓ 2. ⓐⓑⓒⓓ 3. ⓐⓑⓒⓓ 4. ⓐⓑⓒⓓ 5. ⓐⓑⓒⓓ
	6. ⓐⓑⓒⓓ 7. ⓐⓑⓒⓓ

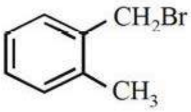
Space for Rough Work

8. Compound (A), C_8H_9Br, gives a white precipitate when warmed with alcoholic $AgNO_3$. Oxidation of (A) gives an acid (B), $C_8H_6O_4$. (B) easily forms anhydride on heating. Identify the compound (A).

(a) 

(b) 

(c) 

(d) 

9. The reaction of $C_6H_5N_2^+Cl^-$ with CuCl gives

(a) C_6H_5Cl (b) C_6H_6

(c) $C_6H_5-C_6H_5$ (d) $C_6H_4Cl_2$

10. Conant Finkelstein reaction for the preparation of alkyl iodide is based upon the fact that

(a) Sodium iodide is soluble in methanol, while sodium chloride is insoluble in methanol

(b) Sodium iodide is soluble in methanol, while NaCl and NaBr are insoluble in methanol

(c) Sodium iodide is insoluble in methanol, while NaCl and NaBr are soluble

(d) The three halogens differ considerably in their electronegativity

11. Tertiary alkyl halides are practically inert to substitution by S_N2 mechanism because of

(a) steric hindrance (b) inductive effect

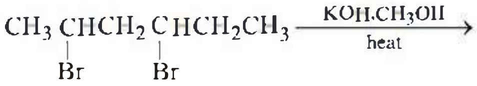
(c) instability (d) insolubility

12. Which one is most reactive towards S_N1 reaction ?

(a) $C_6H_5CH(C_6H_5)Br$ (b) $C_6H_5CH(CH_3)Br$

(c) $C_6H_5C(CH_3)(C_6H_5)Br$ (d) $C_6H_5CH_2Br$

13. The major product of the following reaction is :



$$\underset{Br}{CH_3\,CH}CH_2\,\underset{Br}{CH}CH_2CH_3 \xrightarrow[\text{heat}]{KOH.CH_3OH}$$

(a) $CH_2=CHCH_2CH=CHCH_3$

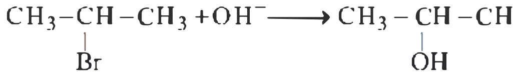
(b) $CH_2=CHCH=CHCH_2CH_3$

(c) $CH_3CH=C=CHCH_2CH_3$

(d) $CH_3CH=CH-CH=CHCH_3$

14. Which of the following is an example of S_N2 reaction?

(a) $CH_3Br+OH^- \longrightarrow CH_3OH+Br^-$

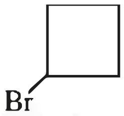
(b) 

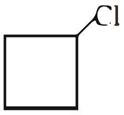
$$CH_3-\underset{Br}{CH}-CH_3+OH^- \longrightarrow CH_3-\underset{OH}{CH}-CH_3$$

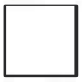
(c) $CH_3CH_2OH \xrightarrow{-H_2O} CH_2=CH_2$

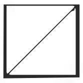
(d) $(CH_3)_3C-Br+OH^- \longrightarrow (CH_3)_3COH+Br^-$

15. What would be the product formed when 1–bromo–3–chlorocyclobutane reacts with two equivalents of metallic sodium in ether?

(a) 

(b) 

(c) 

(d) 

16. Chlorination of toluene in the presence of light and heat followed by treatment with aqueous NaOH gives

(a) *o*-Cresol (b) *p*-Cresol

(c) 2,4-Dihydroxytoluene (d) Benzoic acid

17. The starting substance for the preparation of iodoform is any one of the following, except

(a) $CH_3CH(OH)CH_3$ (b) CH_3CH_2OH

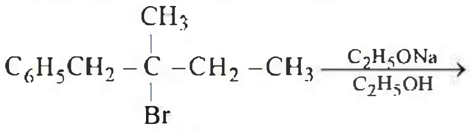
(c) HCH_2OH (d) CH_3COCH_3

18. The following reaction proceeds through the intermediate

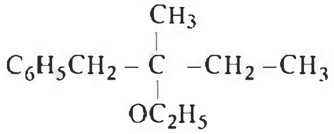
$$RCOOAg + Br_2 \longrightarrow RBr + CO_2 + AgBr$$

(a) $RCOO^\bullet$ (b) $R^\bullet$ (c) $Br^\bullet$ (d) All

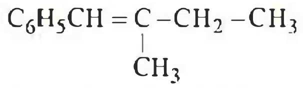
19. The major product of the following reaction is :



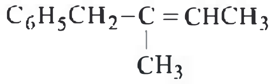
$$C_6H_5CH_2-\overset{CH_3}{\underset{Br}{C}}-CH_2-CH_3 \xrightarrow[C_2H_5OH]{C_2H_5ONa}$$

(a) 

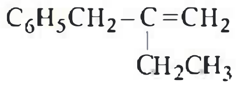
$$C_6H_5CH_2-\overset{CH_3}{\underset{OC_2H_5}{C}}-CH_2-CH_3$$

(b) 

$$C_6H_5CH=\underset{CH_3}{C}-CH_2-CH_3$$

(c) 

$$C_6H_5CH_2-\underset{CH_3}{C}=CHCH_3$$

(d) 

$$C_6H_5CH_2-\underset{CH_2CH_3}{C}=CH_2$$

RESPONSE GRID					
	8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ	10. ⓐⓑⓒⓓ	11. ⓐⓑⓒⓓ	12. ⓐⓑⓒⓓ
	13. ⓐⓑⓒⓓ	14. ⓐⓑⓒⓓ	15. ⓐⓑⓒⓓ	16. ⓐⓑⓒⓓ	17. ⓐⓑⓒⓓ
	18. ⓐⓑⓒⓓ	19. ⓐⓑⓒⓓ			

Space for Rough Work

20. The reaction :

$C_2H_5●H + SOCl_2 \xrightarrow{Pyridine} C_2H_5Cl + SO_2 + HCl$

is known as

(a) Kharasch effect (b) Williamson's synthesis
(c) Darzen's procedure (d) Hunsdiecker reaction

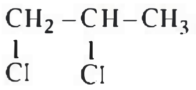
21. If chloroform is left open in air in the presence of sunlight, it gives

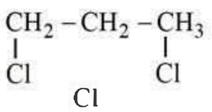
(a) carbon tetrachloride (b) carbonyl chloride
(c) mustard gas (d) lewisite

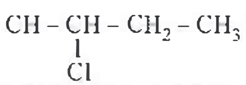
22. In the following reaction sequence :

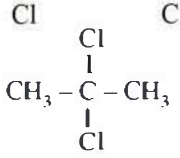
$$\underset{(C_3H_6Cl_2)}{I} \xrightarrow{KOH(aq)} II \xrightarrow[(ii)\ H_2O/H^+]{(i)\ CH_3MgBr} III \xrightarrow{Anhy.ZnCl_2 + Conc.HCl} \text{given turbidity immediatly}$$

The compound I is :

(a)

$\underset{Cl}{CH_2} - \underset{Cl}{CH} - CH_3$

(b)

$\underset{Cl}{CH_2} - CH_2 - \underset{Cl}{CH_3}$

(c)

$CH - \underset{Cl}{CH} - CH_2 - CH_3$

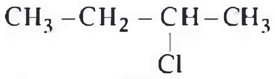
(d)

$CH_3 - \overset{Cl}{\underset{Cl}{C}} - CH_3$

23. Mg reacts with RBr best in

(a) $C_2H_5OC_2H_5$ (b) $C_6H_5OCH_3$
(c) $C_6H_5N(CH_3)_2$ (d) Equally in all the three

24. Which chloride is least reactive with the hydrolysis point of view?

(a) CH_3Cl (b) CH_3CH_2Cl
(c) $(CH_3)_3CCl$ (d) $CH_2=CH-Cl$

25.

$CH_3 - CH_2 - \underset{Cl}{CH} - CH_3$ obtained by chlorination of n-butane, will be

(a) *l*-form (b) *d*-form
(c) Meso form (d) Racemic mixture

26. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' and reaction in presence of light gives 'Y'. Thus, 'X' and 'Y' are:

(a) X = Benzal chloride, Y = ● – Chlorotoluene
(b) X = *m* – Chlorotoluene, Y = *p* – Chlorotoluene
(c) X = o – and *p* – Chlorotoluene, Y = Trichloromethylbenzene
(d) X = Benzyl chloride, Y = *m* – Chlorotoluene

27. Which reagent cannot be used to prepare an alkyl halide from an alcohol ?

(a) $HCl + ZnCl_2$ (b) NaCl (c) PCl_5 (d) $SOCl_2$

28. A is an optically inactive alkyl chloride which on reaction with aqueous KOH gives B. B on heating with Cu at 300°C gives on alkene C, what are A and C

(a) $CH_3CH_2Cl,\ CH_2=CH_2$
(b) $Me_3CCl, MeCH=CH.Me$
(c) $Me_3CCl,\ Me_2C=CH_2$
(d) $Me_2CH.CH_2Cl,\ Me_2C=CH_2$

29. $CH_3Br + Nu^- \dashrightarrow CH_3 - Nu + Br^-$ The decreasing order of the rate of the above reaction with nucleophiles (Nu^-) A to D is

$[Nu^- = (A)\ PhO^-, (B)\ AcO^-, (C)\ HO^-, (D)\ CH_3O^-]$

(a) A > B > C > D (b) B > D > C > A
(c) D > C > A > B (d) D > C > B > A

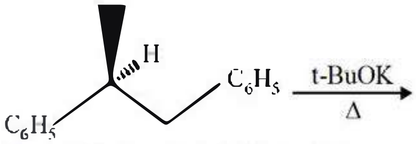
30. Which of the following will have a mesoisomer also?

(a) 2, 3- Dichloropentane (b) 2, 3-Dichlorobutane
(c) 2-Chlorobutane (d) 2-Hydroxypropanoic acid

31. The major product formed when 1, 1, 1-trichloro-propane is treated with aqueous potassium hydroxide is:

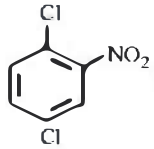
(a) Propyne (b) 1-Propanol
(c) 2-Propanol (d) Propionic acid

32. The major product obtained in the following reaction is :



(a) $(\pm)C_6H_5CH(O^tBu)CH_2C_6H_5$
(b) $C_6H_5CH=CHC_6H_5$
(c) $(+)C_6H_5CH(O^tBu)CH_2C_6H_5$
(d) $(-)C_6H_5CH(O^tBu)CH_2C_6H_5$

33. A major component of Borsch reagent is obtained by reacting hydrazine hydrate with which of the following ?

(a)


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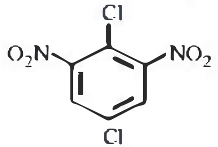
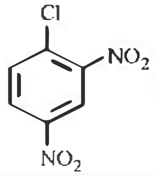
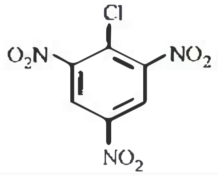


(c)


(d)


RESPONSE GRID	20. ⓐⓑⓒⓓ	21. ⓐⓑⓒⓓ	22. ⓐⓑⓒⓓ	23. ⓐⓑⓒⓓ	24. ⓐⓑⓒⓓ
	25. ⓐⓑⓒⓓ	26. ⓐⓑⓒⓓ	27. ⓐⓑⓒⓓ	28. ⓐⓑⓒⓓ	29. ⓐⓑⓒⓓ
	30. ⓐⓑⓒⓓ	31. ⓐⓑⓒⓓ	32. ⓐⓑⓒⓓ	33. ⓐⓑⓒⓓ	

Space for Rough Work

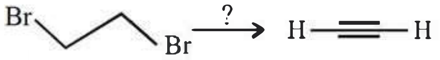
34. Bottles containing C_6H_5I and $C_6H_5CH_2I$ lost their original labels. They were labelled A and B for testing. A and B were separately taken in test tubes and boiled with NaOH solution. The end solution in each tube was made acidic with dilute HNO_3 and then some $AgNO_3$ solution was added. Substance B gave a yellow precipitate. Which one of the following statements is true for this experiment ?

(a) A and $C_6H_5CH_2I$
(b) B and C_6H_5I
(c) Addition of HNO_3 was unnecessary
(d) A was C_6H_5I

35. Aryl fluoride may be prepared from arene diazonium chloride using :

(a) HBF_4/Δ (b) $HBF_4/NaNO_2, Cu, \Delta$
(c) CuF/HF (d) Cu/HF

36. The reagent(s) for the following conversion,



is/are

(a) alcoholic KOH
(b) alcoholic KOH followed by $NaNH_2$
(c) aqueous KOH followed by $NaNH_2$
(d) Zn/CH_3OH

37. An organic compound A (C_4H_9Cl) on reaction with Na/diethyl ether gives a hydrocarbon which on monochlorination gives only one chloro derivative, then A is

(a) tert-butyl chloride (b) sec-butyl chloride
(c) isobutyl chloride (d) n-butyl chloride

38. Read the following statements and choose the correct answer

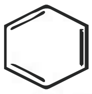
(i) The boiling points of isomeric haloalkanes decrease with increase in branching.
(ii) Among isomeric dihalobenzenes the para-isomers have higher melting point than their ortho and meta-isomers.
(iii) The isomeric dihalobenzene have large difference in their boiling and melting points
(iv) The isomeric dihalobenzene have nearly same boiling point.

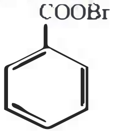
(a) (i), (ii) and (iii) are correct
(b) (i) and (iii) are correct
(c) (ii) and (iv) are correct
(d) (i), (ii) and (iv) are correct

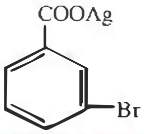
39. Chloroform cannot be prepared from which of the following?

(a) CH_3OH (b) C_2H_5OH
(c) CH_3CHO (d) $(CH_3)_2CO$

40. Silver benzoate reacts with bromine to form

(a)


(b)


(c)


(d) C_6H_5Br

41. Benzene reacts with n-propyl chloride in the presence of anhydrous $AlCl_3$ to give

(a) 3 – Propyl – 1 – chlorobenzene
(b) n-Propylbenzene
(c) No reaction
(d) Isopropylbenzene

42. Match the columns

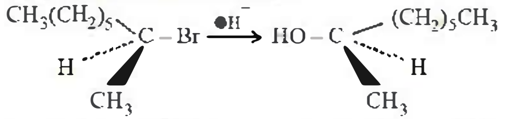
	Column - I		Column - II
A.	$C_2H_6 \xrightarrow{Cl_2/UV\ light} C_2H_5Cl$	I.	Finkelstein reaction
B.	$C_6H_5NH_2 \xrightarrow[273-278K]{NaNO_2+HCl/Cu_2Cl_2} C_6H_5Cl$	II.	Free radical substitution
C.	$CH_3Cl + NaI \longrightarrow CH_3I + NaCl$	III.	Swarts reaction
D.	$CH_3-Br + AgF \longrightarrow CH_3F + AgBr$	IV.	Sandmeyer's reaction

(a) A – II; B – IV; C – I; D – III
(b) A – II; B – III; C – I; D – IV
(c) A – III; B – I; C – IV; D – II
(d) A – IV; B – III; C – I; D – II

43. Which of the following statements is correct?

(a) S_N2 reactions of optically active halides are accompanied by inversion of configuration.
(b) S_N1 reactions of optically active halides are accompanied by racemisation.
(c) Carbocation formed in S_N1 reaction is sp^2 hybridized.
(d) All of the above.

44. The reaction is described as



(a) S_E2 (b) S_N1 (c) S_N2 (d) S_N0

45. Which of the following is not used in Friedel-Crafts reaction?

(a) N–Phenyl acetanilide (b) Bromobenzene
(c) Benzene (d) Chlorobenzene

RESPONSE GRID

34.ⓐⓑⓒⓓ 35.ⓐⓑⓒⓓ 36.ⓐⓑⓒⓓ 37.ⓐⓑⓒⓓ 38. ⓐⓑⓒⓓ
39.ⓐⓑⓒⓓ 40.ⓐⓑⓒⓓ 41.ⓐⓑⓒⓓ 42.ⓐⓑⓒⓓ 43. ⓐⓑⓒⓓ
44.ⓐⓑⓒⓓ 45.ⓐⓑⓒⓓ

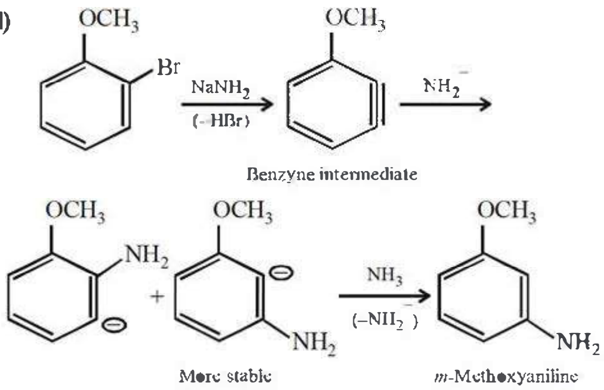
Space for Rough Work

DAILY PRACTICE PROBLEMS

CHEMISTRY SOLUTIONS

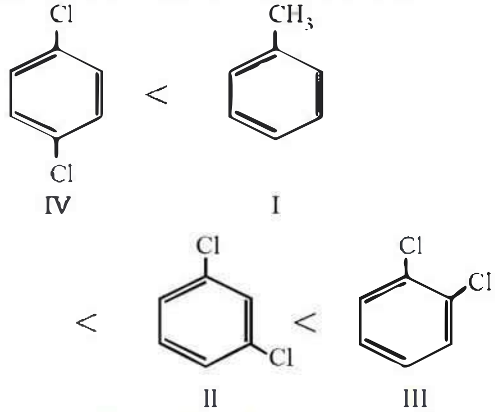
DPP/CC24

1. (d)

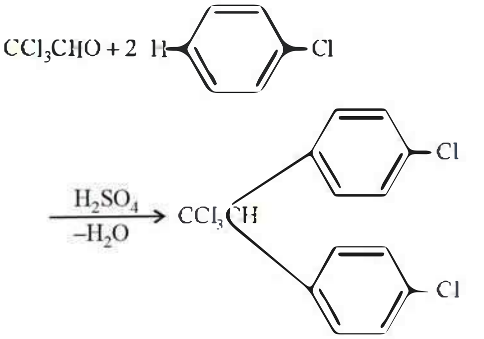


2. (b) Gem-dihalides are those in which two halogen atoms are attached on the same carbon atom.

3. (b) In *p*-dichlorobenzene, the two equal dipoles are in opposite direction, hence the molecule has zero dipole moment. In *o*- and *m*- dichlorobenzenes, the two dipoles are at 60° and 120° apart respectively, and thus according to parallelogram law of forces, the dipole moment of *o*-dichlorobenzene is much higher than that of *m*-isomer. Lastly, toluene with a +I group possesses little dipole moment. Thus the overall order is



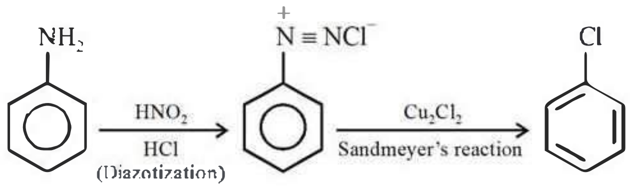
4. (b) DDT is prepared by heating chlorbenzene and chloral with concentrated sulphuric acid



1, 1, 1-trichloro–2,2 bis
(p-chlorophenyl) ethane
or
DDT

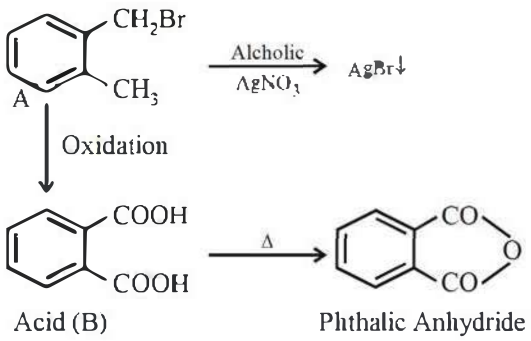
5. (a) 1° Alkyl halides (having least steric hindrance at the α-carbon atom) are most reactive towards S_N2 reaction.

6. (c)



7. (d) –Cl is *o*, *p*-directing.

8. (d)



9. (a)

10. (b)

$$\underset{\text{(CH}_3\text{OH, Me}_2\text{CO)}}{R-X + \underset{\text{Soluble in}}{NaI}} \xrightarrow{\text{acetone}} R-I + \underset{\substack{\text{Insoluble in} \\ (CH_3OH,\ Me_2CO)}}{NaX\downarrow}$$

(where X = Cl or Br)

11. (a) Due to steric hindrance tertiary alkyl halide do not react by S_N2 mechanism they react by S_N1 mechanism. S_N2 mechanism is followed in case of primary and secondary alkyl halides of

$CH_3-X > CH_3-CH_2X > (CH_3)_2-CH.X > (CH_3)_3-C-X$

12. (c) S_N1 reactions involve the formation of carbocations, order of stability of carbocation is 3° > 2° > 1° hence higher the stability of carbocation, more will be the reactivity of the parent alkyl halide. Moreover the tertiary carbocation formed from (c) is stabilized by two phenyl groups.

13. (d)

$$CH_3-\underset{\underset{Br}{|}}{CH}-CH_2-\underset{\underset{Br}{|}}{CH}-CH_2-CH_3$$

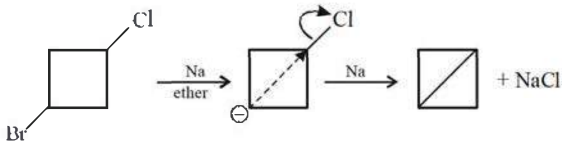
$$\xrightarrow[E2]{KOH,\ CH_3OH\ \Delta}$$

$$CH_3-CH=CH-CH=CH_2-CH_3$$

(Saytzeff product)

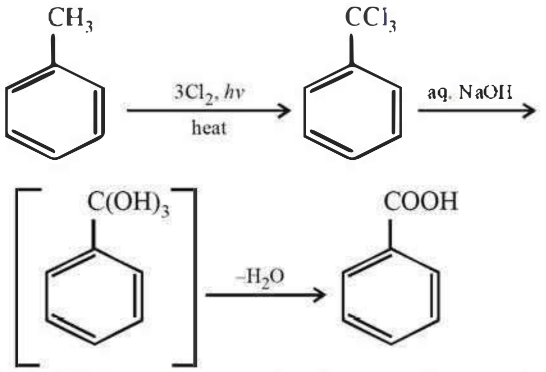
14. **(a)** Only 1° alkyl halides (i.e. CH_3Br) undergo S_N2 reaction.

15. **(d)** It is an example of intramolecular Wurtz reaction.



Br^- is a better leaving group than chloride. In this reaction alkali metal (Na) is electron donor.

16. **(d)**



17. **(c)** CH_3OH does not undergo iodoform reaction, all others do so.

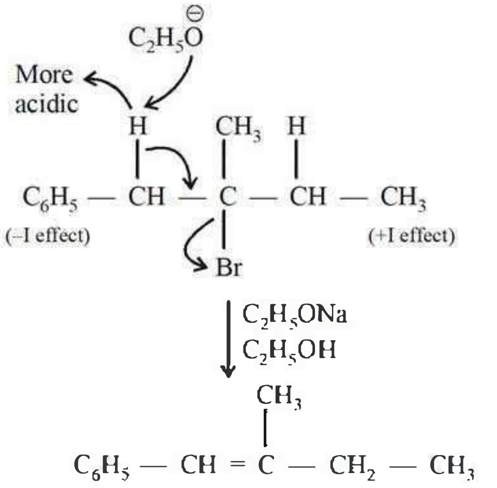
18. **(d)** Mechanism of Hunsdiecker's reaction is

$$R-CO\overline{O}\,\overset{+}{Ag} \xrightarrow[-AgBr]{Br_2} RCOOBr \longrightarrow RCO\dot{O} + \dot{Br}$$

$$\longrightarrow R^{\bullet} + CO_2\,;$$

$$R^{\bullet} + RCOOBr \longrightarrow R-Br + RCO\dot{O}$$

19. **(b)**



20. **(c)** Alkyl halides can be prepared by treating alcohol with $SOCl_2$.

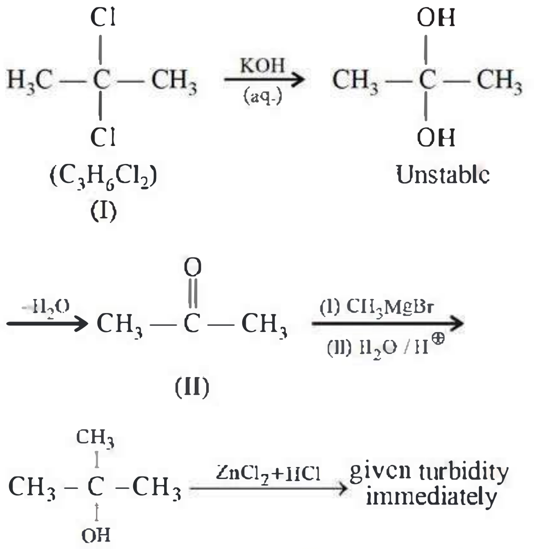
$$CH_3CH_2OH + SOCl_2 \longrightarrow CH_3CH_2Cl + SO_2 + HCl$$

This reaction is known as Darzen's procedure.

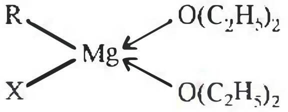
Note : $SOBr_2$ and SOI_2 are not used in this reaction because $SOBr_2$ is less stable and SOI_2 does not exist.

21. **(b)**

22. **(d)**



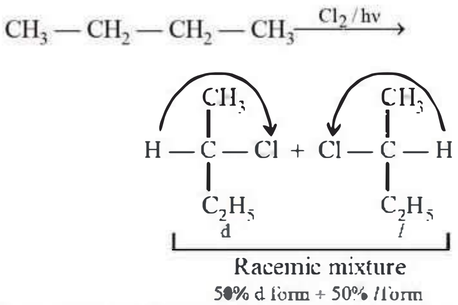
23. **(a)** Although all the three compounds can be used for preparing Grignard reagents, diethyl ether is considered as the best because it provides electron pairs to Mg of the reagent fully for coordination, in case of $C_6H_5OCH_3$ and $C_6H_5N(CH_3)_2$ electron pair on O and N are partialy delocalised over the benzene and hence are less available for coordination with Mg.



24. **(d)** $CH_2 \cdot CH \cdot Cl$
(Vinyl Chloride)

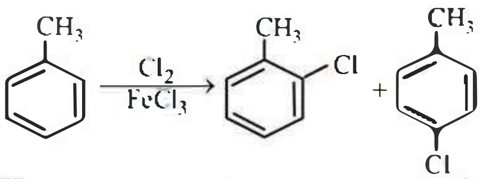
The halogen atom in vinyl chloride is not reactive as in other alkyl halides. The non-reactivity of chlorine atom is due to resonance stabilisation. The *l.p.* on Cl-atom can participate in delocalisation (Resonance) to give two canonical structure.

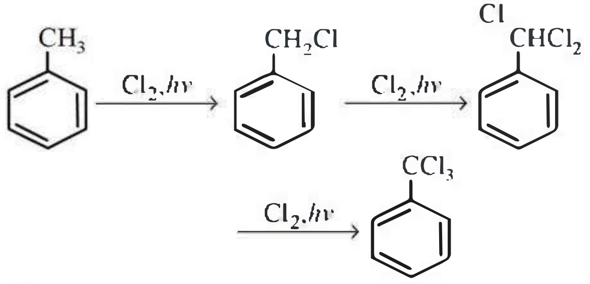
25. **(d)** Chlorination of n-butane taken place via free radical formation i.e., $Cl_2 \xrightarrow{h\nu} Cl^{\bullet} + Cl^{\bullet}$



$Cl^{\bullet}$ may attack on either side and give a racemic mixture of 2 chloro butane which contain 50% d form and 50% *l*-form.

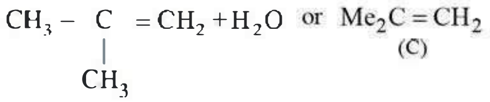
26. **(c)**





27. **(b)**

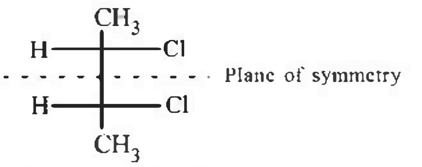
28. **(c)** $\underset{(A)}{Me_3C.Cl} \xrightarrow{KOH} \underset{\text{tert. alcohol}}{Me_3COH} \xrightarrow{Cu/300°}$



$$\underset{\underset{CH_3}{|}}{CH_3-C}=CH_2+H_2O \text{ or } \underset{(C)}{Me_2C=CH_2}$$

29. **(c)** The acid character follows the order :
$CH_3COOH > C_6H_5OH > H_2O > CH_3OH$
The basic character will follow the order
$CH_3COO^- < C_6H_5O^- < \overline{O}H < CH_3O^-$
The stronger the acid, the weaker the conjugate base formed.

30. **(b)** The compound has two similar assymmetric C-atoms. It has plane of symmetry and exist in meso form.

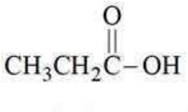


Meso - 2, 3 dichlorobutane

31. **(d)** $Cl_3C-CH_2CH_3+KOH \xrightarrow{heat}$

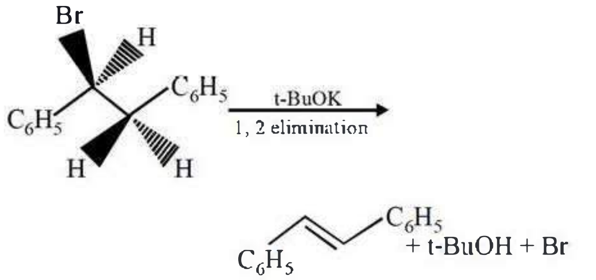
$(OH)_3C-CH_2CH_3+3KCl$

↓

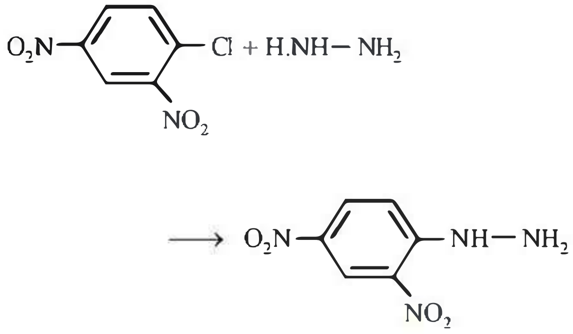


$$CH_3CH_2\overset{\overset{O}{\|}}{C}-OH$$

32. **(b)** Elimination reaction is highly favoured if
(a) Bulkier base is used
(b) Higher temperature is used
Hence in given reaction biomolecular elimination reaction provides major product.



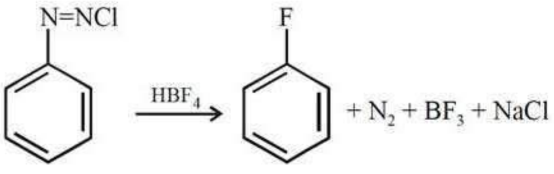
33. **(c)** The major component of Borsch reagent is 2,4-dinitrophenyl hydrazine which can be obtained by reaction of 2,4-dinitrochloro benzene and hydrazine



2,4 -dinitrophenyl hydrazine

34. **(d)** $C_6H_5I \xrightarrow{NaOH} C_6H_5ONa \xrightarrow{HNO_3/H^+}$
$C_6H_5OH \xrightarrow{AgNO_3}$ No yellow ppt.
$C_6H_5CH_2I \xrightarrow{NaOH} C_6H_5CH_2ONa$
$\xrightarrow{HNO_3/H^+} C_6H_5CH_2OH$
$\xrightarrow{AgNO_3}$ yellow ppt.
Since benzyl iodide gives yellow ppt. hence this is compound B and A was phenyl iodide (C_6H_5I).

35. **(a)**



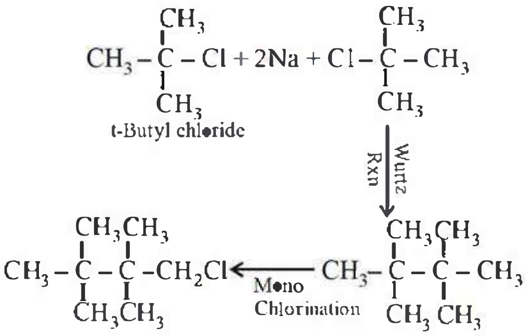
(Balz-Schiemann's reaction)

36. **(b)** $BrCH_2-CH_2Br \xrightarrow[-HBr]{Alc.KOH} CH_2=CHBr$

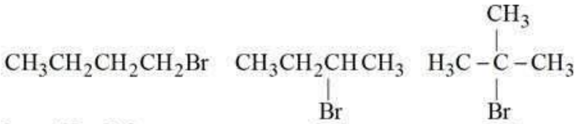
$\xrightarrow[-HBr]{NaNH_2} CH\equiv CH$

Elimination of HBr from $CH_2=CHBr$ requires a stronger base because here, Br acquires partial double bond character due to resonance.

37. **(a)**

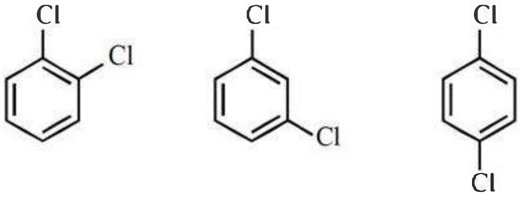


38. **(d)** The boiling points of isomeric haloalkanes decrease with increase in branching. For example, 2-bromo-2-methylpropane has the lowest boiling point among the three isomers.



	$CH_3CH_2CH_2CH_2Br$	$CH_3CH_2\underset{Br}{\underset{\vert}{C}}HCH_3$	$H_3C-\overset{CH_3}{\underset{Br}{C}}-CH_3$
b.p./K	375	364	346

Boiling points of isomeric dihalobenzenes are very nearly the same. However, the para-isomers are high melting as compared to their ortho and meta-isomers. It is due to symmetry of para-isomers that fits in crystal lattice better as compared to ortho- and meta-isomers.



b.p/K	453	446	448
m.p/K	256	249	323

39. **(a)** $\underset{\text{Ethanol}}{CH_3CH_2OH} + Cl_2 \xrightarrow{\text{oxidation}} \underset{\text{Ethanal}}{CH_3CHO} + 2HCl$

$\underset{\text{Ethanal}}{CH_3CHO} + 3Cl_2 \longrightarrow \underset{\text{Chloral}}{CCl_3CHO} + 3HCl$

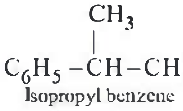
$2CCl_3CHO + Ca(OH)_2 \longrightarrow \underset{\text{Chloroform}}{2CHCl_3} + \underset{\text{Cal. formate}}{(HCOO)_2Ca}$

$\underset{\text{Acetone}}{CH_3COCH_3} + 3Cl_2 \longrightarrow \underset{\text{Trichloroacetone}}{CCl_3COCH_3} + 3HCl$

$2CCl_3CO.CH_3 + Ca(OH)_2 \longrightarrow 2CHCl_3 + (CH_3COO)_2Ca$

40. **(d)** $C_6H_5COOAg + Br_2 \xrightarrow{\text{Hunsdiecker reaction}} C_6H_5Br + CO_2 + AgBr$

41. **(d)** $C_6H_6 + CH_3CH_2CH_2Cl \xrightarrow[\text{AlCl}_3]{\text{Anhyd.}}$



$\underset{\text{Isopropyl benzene}}{C_6H_5-\overset{CH_3}{\overset{\vert}{C}H}-CH_3}$

42. **(a)** Alkyl iodides are often prepared by the reaction of alkyl chlorides/bromides with NaI in dry acetone. This reaction is known as Finkelstein reaction.

$R-X + NaI \longrightarrow R-I + NaX$

$X = Cl, Br$

NaCl or NaBr thus formed is precipitated in dry acetone. It facilitates the forword reaction according to le chatelier's principle. The synthesis of alkyl fluorides is best accomplished by heating an alkyl chloride/bromide in the presence of a metallic fluoride such as AgF, Hg_2F_2, CoF_2 or SbF_3. The reaction is termed as Swarts reaction.

$H_3C-Br + AgF \longrightarrow H_3C-F + AgBr$

43. **(d)** In case of optically active alkyl halides, the product formed as a result of S_N2 mechanism has the inverted configuration as compared to the reactant. This is because the nucleophile attaches itself on the side opposite to the one where the halogen atom is present. In case of optically active alkyl halides, S_N1 reactions are accompanied by racemisation. The carbocation formed in the slow step being sp^2 hybridised is planar (achiral).

44. **(c)** Inversion in configuration occurs in S_N2 reactions.

45. **(a)**